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sected with a view to ascertaining their time of breeding. With all the condition of the sexual organs were similar, viz., at the very lowest stage of erotic development. The testes of the males were scarcely larger than dust shot, while the ovaries of the females presented the appearance of whitish sacs in which the separate ovules could not be clearly seen without the aid of a glass. I examined the females for signs of recent ovulation or incubation, but could find none. Furthermore, a male, taken June 18, showed every indication of being a young bird about eight or ten weeks from the nest. Its plumage differed appreciably from that of some adults shot the same day, and its skull and bones were soft, the skull having that flexible, skin-like character found only in young birds.

" These facts confirm a suspicion which I have entertained for a long time, viz., that Wilson's petrel breeds in winter or early spring in tropical or sub-tropical regions, and visits the coast of the Northeastern United States *only in the interim between one breeding season and the next.* In support of this theory are the following facts: (1) That although the bird literally swarms off our coast during June, July and August, no one has ever found it breeding on the neighboring shores. (2) That the sexual organs of numerous summer specimens which I have dissected have been invariably undeveloped. (3) That a specimen taken June 18, although apparently a young bird, was at least two months old, thus indicating a date of breeding when the species is not to be found in our waters. If the above conclusions prove correct, the case, as far as we now know, will be unique. But there are reasons for suspecting that the same thing obtains with other North American Procellaridæ, especially our two common species of Puffinus."

We are told that the common guillemot (*Lomvia troile*) still breeds at Bird rocks in amazing numbers, but that the number is rapidly decreasing, owing to the introduction of a cannon which is fired every half hour during foggy weather. Mr. Brewster writes: " At each discharge the frightened Murres fly from the rocks in clouds, nearly every sitting bird taking its egg into the air between its thighs and dropping it after flying a few yards. This was repeatedly observed during our visit, and more than once a perfect shower of eggs fell into the water around our boat."—*C. H. M.*

SEEBOHM'S SIBERIA IN ASIA.[1]—Though it is over a year since the appearance of this book, we desire to call attention to it as one of the best recent books of travel. The author is well known as a distinguished ornithologist. This work not only shows his talents as an observer, but as a traveler and a narrator. The story is told in an exceedingly interesting way; the illustrations, by Whymper, are dainty, well drawn, and add vastly to the interest and ethnographic value of the book, the author having an eye to the social peculiarities of the Asiatic tribes he met as well as their costumes and weapons.

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[1] *Siberia in Asia.*—A visit to the valley of the Yenesay in East Siberia, with description of the natural history, migration of birds, etc. By HENRY SEEBOHM. With map and illustrations. John Murray. 12mo, pp. 298.

The work will be of lasting value from the contributions not only to ornithology contained in it, but from the account of the tundras; the breaking up of the ice in the Siberian rivers, and other characteristics of Siberian nature and scenery. The journey was made overland by winter (1877–8), from St. Petersburg to the River Yenesay at Krasnoyarsk, going northward down the river to its tributary, the Koorayika. Mr. Seebohm spent the spring there waiting for the ice to break up and leave the river, so as to release the steamer belonging to his companion, Captain Wiggins, who had planned to take her laden with wheat around through the Arctic sea to England. It may here be said that the steamer was stranded in the Yenesay, and that the two returned overland.

The phenomenon of the breaking up of the Siberian rivers is an exceedingly interesting one. It should be borne in mind that the Yenesay is next in size to the Amazon, being over 3000 miles in length. The ice beginning to break up far northward passes down, choking up the river below, and raising the water in the different tributaries near its mouth, carrying the ice up these streams.

The winter lasted till the first week in June, ice forming each night in May. "On the 1st of June a revolution took place in the ice. There had been scarcely any frost during the night. The wind was south, not very warm, but the sun was unusually hot. As we turned out of the cabin after breakfast, we were just in time to see a small range of mountains suddenly form at the lower angle of the juncture between the Koo-ray-i-ka and the Yen-e-say. The river had risen considerably during the night, and the newly-formed strip of thin ice, on each side of the center ice, was broader than it had ever been. The pressure of the current underneath caused a large field of ice, about a mile long and a third of a mile wide, to break away. About half the mass found a passage down the strip of newly-formed thin ice, leaving open water behind it; the other half rushed headlong on to the steep banks of the river, and, driven on irresistibly by the enormous pressure from behind, it piled itself up into a little range of mountains, fifty or sixty feet high, and picturesque in the extreme. Huge blocks of ice, six feet thick and twenty feet long, in many places stood up perpendicularly. Others were crushed up into fragments like broken glass. The real ice on the river did not appear to have been more than three feet thick, clear as glass, and blue as an Italian sky. Upon the top of this was about four feet of white ice. This was hard as a rock, and had no doubt been caused by the flooding of the snow when the water rose, and its subsequent freezing. On the top of the white ice was about eighteen inches of clear snow which had evidently never been flooded. Everything remained in *statu quo* during the rest of the day. The river was certainly rising, but slowly. * * * We turned into our berths at half-past nine, having first instituted an anchor-watch in case any further movement of the ice should take place. We had but just fallen asleep when we were suddenly roused by the report that the river was rising rapidly, and the ice beginning to break up. We immediately dressed and went on deck. The position of affairs was at once obvious. The melting of the snow down south was evidently going on rapidly, and the river was rising at such speed that it was beginning to flow up all its tributaries in the north." Getting up steam to be ready for any emergency they found to their dismay that they were squeezed ashore, while the water afterwards fell. "The current was still running up the river, and against it there was no chance of swinging the ship round. A mile astern of us was the edge of the Yen-e-say ice. There was nothing to be done but to wait. In a short time the river began to rise again rapidly, and with it our hopes that we might float and steam into safety, when suddenly we discovered, to our terror, that the ice on the Yen-e-say was breaking up, and that a dread phalanx of ice-floes and pack ice was coming down on us at quick march." How the rudder was smashed, how the "ice-floe began to climb up the ship's side like a snake;" how some of the sailors got overboard, throwing their goods and chattels to their comrades ashore, until finally an immense ice-floe struck the ship, is well told. "At length an immense ice-floe of irresistible weight struck the ship. There was no alternative but to slip the anchor and allow her to drive with the ice. Away we went up the Koo-ray-i-ka, the ice rolling and tumbling and squeezing alongside of us, huge lumps climbing one upon the top of another. We were carried along in this way for about a mile, until we were finally jammed into a slight bay, wedged between blocks of pack-ice. Soon afterwards the river fell some five or six feet, the stream slackened, the ice stood still, and the ship and the pack-ice were aground. * * * The ice remained quiet until about midnight, when an enormous pressure from above came on somewhat suddenly. It had apparently broken up the great field to the north of the Koo-ray-i-ka, but not to an extent sufficient to relieve the whole of the pressure. The water in the Koo-ray-i-ka once more rose rapidly. The immense field of pack-ice began to move up stream at the rate of five or six knots an hour." The stream rose and fell during the day; by noon of the next day, after various vicissitudes to the ship, the water had sunk five or six feet, and the vessel lay on her side, with her bow at least three feet aground. "These sudden falls in the level of the water were no doubt caused by the breaking up of the ice lower down the river, which dammed it up, until the accumulated pressure from behind became irresistible. Some idea of what this pressure must have been may be realized by the fact that a part of the river a thousand miles long, beginning with a width of two miles, and ending with a width of six miles, covered over with three feet of ice, upon which was lying six feet of snow, was broken up at the rate of a hundred miles a day. Many obstacles would cause a temporary stoppage in the break-up of the ice; a sudden bend in the river, a group of islands or a narrower place where the ice might jam. But the pressure from behind was an ever-increasing one. Although the river frequently fell for a few hours, it was constantly rising on an average, and in ten days the river where we were stationed was seventy feet. Such a display of irresistible power dwarfs Niagara into comparative insignificance. On several occasions we stood on the banks of the river, for hours, transfixed with astonishment, staring aghast at icebergs, twenty to thirty feet high, driven down the river at a speed of from ten to twenty miles an hour. The battle of the Yen-e-say raged for about a fortnight, during which the Koo-ray-i-ka alternately rose and fell. Thousands of acres of ice were marched around up stream for some hours, then the tide turned, and they were marched back again. This great annual battle between summer and winter is the great event of the year in these regions, like the rising of the Nile in Egypt. * * * This sudden change in the short space of a fortnight, from mid-winter to mid-summer, can scarcely, by courtesy, be called spring. It is a revolution of nature, and on a scale so imposing, that the most prosaic of observers cannot witness it without feeling its sublimity."

The ice was still straggling down stream, while the country was flooded for miles on each side of the river; hundreds of acres of ice had drifted into the forests, and when the water subsided, frozen blocks would probably be stranded among the trees, and gradually melt on the ground a few days later. "It was astonishing to see the quantity of wood that was floating down, but as we coasted the shore to avoid the current, we easily saw whence it all came. In many cases the banks were undermined for six or eight feet; in some places they had fallen in, and the trees growing upon them were hanging down in the water. The banks are nothing but sand and earth; the river evidently widens every year, and carries an immense quantity of mud down to its mouth."

Among modern travelers Nordenskiöld has given us considerable information regarding the tundras, but he only saw it from the seashore. Here are two pictures of these vast flat lowlands of the treeless portions of Siberia. "I went ashore in the morning to ascertain what bird-life was to be found on the tundra. We climbed up the steep bank, and found ourselves in a wild-looking country full of lakes, swamps, and rivers, a dead flat in some places, in others undulating, even hilly. This was the true Siberian tundra, brilliant with flowers, swarming with mosquitos, and full of birds. In sheltered places, dwarf willows and weeping birch were growing, and (we were only some fifty versts from the forests) here and there a few stunted larches. Winding through the tundra was the track of what had once been the bed of a river, nothing now but a small deep valley forming a chain of isolated lakes and pools. * * * On some of the northern slopes, large patches of snow were still lying."

"The history of animal and vegetable life on the tundra is a very curious one. For eight months out of the twelve every trace of vegetable life is completely hidden under a blanket, six feet thick, of snow, which effectually covers every plant and bush—trees there are none to hide. During six months of this time at least, animal life is only traceable by the footprints of a reindeer or a fox on the snow, or by the occasional appearance of a raven or a snowy owl, wandering above the limits of forest growth, where it has retired for the winter. * * * Then comes the south wind, and often rain, and the great event of the year takes place; the ice in the great rivers breaks up, and the blanket of snow melts away. The black earth absorbs the heat of the never-setting sun; quietly but swiftly vegetable life awakes from its long sleep, and for three months a hot summer produces a brilliant alpine flora, like an English flower garden run wild, and a profusion of alpine fruit, diversified only by storms from the north, which sometimes for a day or two bring cold and rain down from the Arctic ice.

That the tundra is the former bottom of the Arctic ocean seems to us to be proved by the shallowness of the Arctic sea north of Siberia as shown by Nordenskiöld's map, also by the presence of hills of shells found by Seebohm, at least 500 feet above the sea, belonging to species still living in the Arctic ocean, the fossils occurring near or in a bluish, sandy clay. Space is not left us to speak of Seebohm's discoveries regarding the migrations of birds in Siberia, and the new facts he discovered regarding their hybridity and nesting habits. The volume will supplement Nordenskiöld's narrative.

WINCHELL'S WORLD-LIFE.[1]—The mode of formation, growth and decay of the worlds that people the universe is the loftiest theme upon which the human mind can exercise itself, but from its very loftiness is one upon which, as Professor Winchell would himself be one of the first to admit, certain knowledge has not yet been attained. When rival theories dispute for precedence, or

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[1] *World-Life or Comparative Geology.* By ALEXANDER WINCHELL, LL.D., Professor of Geology and Palæontology in the University of Michigan. Chicago, S. C. Griggs & Co., 1883.